

**Background Research for Proposed Resolution to the AKBLG Annual General Meeting:**  
**Microcell Transmitter Placement Consultation**

(Submitted by Beverley Tripp, Councillor, City of Grand Forks)

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## **Introduction:**

An issue that has recently come to my attention has to do with the proliferation of “microcell transmitters” (aka small cell transmitters) in our communities. Small cell transmitters are being placed on utility poles and buildings throughout the province, as higher cell towers are no longer necessary to transmit existing 4G and upcoming 5G (fifth generation) wireless transmission, yet a greater density of transmitters is required to override competing signals.

There has been a great upsurge in activity in the Internet Communications Technology (ICT) industry in the last few years, and this trend is projected to escalate by orders of magnitude with the move to 5G and the *Internet of Everything* (IoE). This quote comes from “What Is 5G.org,” a website dedicated to informing the public about the “Internet of Everything (IoE):

*“The transition to the Internet of Everything may be one of the defining environmental, health, sociological and ethical issues of our times. It is crucial that we become informed, as our {US} government has handed over to the wireless industry and to the private business sector, our health, our earth, and indeed our humanity – and we need to respond.”*

Also, according to the *Institute for the Future* (funded in part by the Rockefeller Foundation),

*“The next decade will be a period of rapid expansion in the supply of urban data and increasing sophistication in its use...Smart personal devices and embedded sensing in buildings and infrastructure will collect observations about human activity and urban habitats...These sensory data streams and city simulations will increasingly be connected through open sharing standards and technologies.”*

This is a concerning development in light of the many scientifically substantiated health and environmental concerns surrounding man-made electromagnetic (EMF) exposure.

In 2013, the Federation of Canadian Municipalities (FCM) fought hard to ensure that municipalities had some control of standard tower (over 15 meters) infrastructure in their communities by legislating that all towers over 15 meters be vetted in a pre-set protocol.<sup>1</sup> Yet Industry Canada’s policies say that no municipal approval or notification is required if a microcell transmitter is put on any existing structure, e.g. pole, tower, apartment building, etc., which means they can be put virtually anywhere.

There have been literally thousands and thousands of peer-reviewed studies indicating that electromagnetic radiation (EMR), even in small doses, is damaging and harmful to all life. There is also compelling new evidence that multiple source electromagnetic radiation causes exponential harm to living organisms.<sup>2</sup> That is why it is disturbing to learn that the microcells can be densely and randomly placed in close proximity to people’s living spaces, children’s classrooms, hospitals, public spaces, and ecologically sensitive areas, with no community consultation whatsoever.

Municipalities and residents deserve to be notified and consulted in the placement of these transmitters. I further believe that BC municipalities could be proactively looking at developing appropriate safety regulations for their communities regarding microcell placement.

Control over our electromagnetic environment is an issue for the 21st century that needs to be intelligently addressed, with precautionary principles applied while further studies into its safety or harm are conducted.

I believe this issue should be raised at the UBCM this fall, and I would like to propose that the attached motion be taken to the AKBLG for consideration at the UBCM in September.

Beverley Tripp, Grand Forks City Councillor

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## **Background Research**

### Changes to Canada's Antenna Tower Siting Policy (from the FCM Website)

In April 2014, Industry Canada announced a new process a company must follow when installing a new radio communication antenna tower. The Joint Protocol on Antenna Siting, first developed in 2013 by FCM and the Canadian Wireless Telecommunications Association (CWTA), has been updated to reflect the regulations on antenna siting, which took effect in July 2014.

Companies must share towers where possible, consult with the local land-use authority (generally the municipality) and the public as required, and adhere to any local antenna siting protocol that exists. Industry Canada has also officially removed the exemption that had permitted antenna towers under 15 meters be built without notification or consultation with municipalities and the public.

FCM has been leading the effort to make the antenna siting process responsive to community needs.

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### UBCM Communique: Changes in Cell Tower Rules

Feb. 19, 2014

The Federal Government has announced new rules that telecommunication companies will need to meet when locating cell towers.

The new requirements are intended increase transparency by ensuring that *municipalities are notified* regarding the proposed siting of all cell towers; local residents are given an opportunity to provide input; and communications are improved throughout the siting process.

Under the new rules a company will be required to:

- consult on all commercial tower installations, regardless of height. Previously a company was only required to consult with local residents when it was planning to build a tower higher than 15 metres.
- establish a three year limit between the time of consultation and the time the tower is built; and
- ensure that local residents are informed about consultations on plans to build a cell tower in their area by requiring the company to notify them directly.

The Federal government intends to introduce new online measures so that the public will be able to monitor the process and track the status of applications for new cell towers. The industry will be encouraged to cooperate with local government early on in the process, using the recently launched Antenna System Siting Protocol Template developed by the FCM.

Telecommunication companies wanting to build a new tower will be required to look at sharing an existing tower or using an existing structure for its antenna before applying to build a new tower.

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FCC (US) Public Notice: Streamlining Deployment of Small Cell Infrastructure (December 22, 2016)

Microcells are being installed across North America to facilitate wireless communications. These cell transmitters are replacing, to a large degree, the large towers that require municipal notification and consultation. The FCC in the USA is pushing through regulations that will prevent local governments and citizens, who will have these microcells feet from their homes, from having any input. Here is the FCC document. I believe there is a lot to learn from reading this – perhaps some of it can help us confront this horrible proliferation of microwave radiation.

FCC Public Notice - COMMENT SOUGHT ON STREAMLINING DEPLOYMENT OF SMALL CELL INFRASTRUCTURE BY IMPROVING WIRELESS FACILITIES SITING POLICIES<sup>3</sup>

<http://www.stopsmartmetersbc.com/wp-content/uploads/2017/01/FCC-Public-Notice-re-Small-Cell-Siting.pdf>

Excerpts from FCC Public Notice:

- *"In particular, many wireless providers are deploying small cells and distributed antenna systems (DAS).... They must be deployed more densely – i.e., in many more locations – to function effectively. ..This trend in infrastructure deployment is expected to continue, and even accelerate, as wireless providers begin rolling out 5G services." (Page 1)*
- *DAS Nodes can be placed "on light stanchions, utility poles, building walls and rooftops, and other small structures either on private property or on the public rights of way" (Page 4 Footnotes)*
- *"It is our responsibility to ensure that this deployment of network facilities does not become subject to delay caused by the unnecessarily time-consuming and costly siting review processes that may be in conflict with the Communications Act." (Page 2)*
- *"Section 332 also provides that state and local governments may not deny wireless facilities siting applications "on the basis of the environmental effects of radio frequency emissions," a matter over which the Commission has exclusive jurisdiction." (Page 6)*

Microcell Specifications

From Sharon Noble: Doug Anastos, of Telus, in an email of Nov. 3 confirmed that the “microcells” have powerful transmitters, one with 20 watts of power and the other with 10. He also advised that the signals from a single transmitter can go as far as 200 meters. These transmitters are extremely powerful and are aimed at the homes in a broad signal, with all in the area being exposed, not just Telus customers.

- At roughly one square foot in size, small cells house all of the necessary antenna, radios and other equipment in one unit. The antennas are directional which means that the signal (i.e. power output) is directed out in one broad direction. The typical range of small cells is 100-200 meters. Range can vary on a number of factors including population density, topography, tree cover, etc.
- The peak electricity consumption of each small cell unit is 160 Watts. TELUS small cells operate on two frequencies: 1900 MHz (UMTS – 3G technology) and 2100 MHz (LTE – 4G technology). Maximum radio output of this UMTS unit is 20W. Maximum power output of the LTE unit is 10W.

## Research and Studies on EMF Radiation and “Wireless Tech”

### 1. BioInitiative Working Group:

Bio-Initiative Report 2012 (2014): *"Bioeffects are clearly established and occur at very low levels of exposure to electromagnetic fields and radiofrequency radiation. Bioeffects can occur in the first few minutes at levels associated with cell and cordless phone use. Bioeffects can also occur from just minutes of exposure to mobile phone masts [cell towers], Wi-Fi and wireless utility "smart" meters that produce whole body exposure. Chronic base station [cell tower] exposures can result in illness."*

“New Studies Show Health Risks from Wireless Tech: Warnings from the BioInitiative Working Group,” University at Albany, Rensselaer, New York /April 16, 2014

The BioInitiative Working Group says evidence for health risk from wireless tech is growing stronger and warrants immediate action. The Group released a mid-year update covering new science studies from 2012 to 2014. New studies intensify medical concerns about malignant brain tumors from cell phone use. *“There is a consistent pattern of increased risk for glioma (a malignant brain tumor) and acoustic neuroma with use of mobile and cordless phones”* says Lennart Hardell, MD, PhD at Orebro University, Sweden, according to studies released in 2012 and 2013. *“Epidemiological evidence shows that radiofrequency should be classified as a known human carcinogen. The existing FCC/IEEE and ICNIRP public safety limits are not adequate to protect public health.”*

The BioInitiative reports nervous system effects in 68% of studies on radiofrequency radiation (144 of 211 studies) in 2014. This has increased from 63% in 2012 (93 of 150 studies) in 2012. Studies of extremely-low frequency radiation are reported to cause nervous system effects in 90% of the 105 studies available in 2014. Genetic effects (damage to DNA) from radiofrequency radiation is reported in 65% (74 of 114 studies); and 83% (49 of 59 studies) of extremely-low frequency studies.

Mobile wireless devices like phones and tablets are big sources of unnecessary biological stress to the mind and body that can chip away at resilience over time. The Report warns against wireless in schools. Schools should provide internet access without Wi-Fi. *“It is essentially an unregulated experiment on childrens’ health and learning. Microwave from wireless tech disrupts thinking – what could be worse for learning? Technology can be used more safely with wired devices that do not produce these biologically-disruptive levels of microwave radiation”* said Cindy Sage, Co-Editor of the BioInitiative Report.

Federal programs like ConnectED and E-Rate are calling for wireless classrooms while ignoring the health evidence. Hyperactivity, concentration problems, anxiety, irritability, disorientation, distracted behavior, sleep disorders, and headaches are reported in clinical studies. Government reviews on health impacts of wireless radiofrequency radiation from the European Union and Australia continue to be inconclusive largely because they require certainty before issuing warnings. The FCC review of health impacts from wireless technologies is still underway, but has not affected the federal push for wireless classrooms.

See: [www.bioinitiative.org](http://www.bioinitiative.org)

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## 2. Sampling of Relevant Published Studies:

Listed below are a handful of published studies, mainly from medical and scientific sources, which document the dramatic health effects of cell antennas sited close to public and residential places. These reports describe mainly the bio-effects of the older broadcast, radar and 2G/3G antenna technologies, not the next generation 5G small cell transmitters.

◆ **Lester and Moore (1982)** This study of 92 active Air Force bases operational between 1950-1969 found that counties with an active base had significantly higher incidences of cancer mortality compared to counties without. The authors hypothesized that the chronic, low intensity microwave exposure to peak pulse patterns characteristic of radar (microwave radiation) at the bases could damage immunity and account for the high cancer mortality in military counties. Numerous other reports of community sickness from radar installations have come to light in the last thirty years. Recent reports include: an epidemic of sickness and mental retardation suffered by people in Taiwan who live close to Doppler weather radar stations and an ongoing investigation of a childhood cancer cluster near eight military-grade radar towers in Herkimer County, New York State. In addition to police, weather and military radar pollution which blankets the US, the upcoming V2V and driverless car/truck systems are slated to additionally smother the population with new and universal systems of ground-level radar pollution.

<http://dx.doi.org/10.3109/15368378209040329>

◆ **Kolodynski & Kolodynska (1996)** This study found that school children living near a radio location station in Latvia suffered reduced motor function, memory and attention span.

[http://dx.doi.org/10.1016/0048-9697\(95\)04924-X](http://dx.doi.org/10.1016/0048-9697(95)04924-X)

◆ **Magras et al. (1997)** Researchers reported a decrease in reproductive function of mice exposed to cell tower radiation and irreversible sterility was documented in fifth generation offspring.

[http://www.emrpolicy.org/litigation/case\\_law/beebe\\_hill/magras\\_mice\\_study.pdf](http://www.emrpolicy.org/litigation/case_law/beebe_hill/magras_mice_study.pdf)

◆ **Hecht & Balzer (1997)** A review of hundreds of Soviet Russian studies documented a vast array of health effects, including insomnia, brainwave aberrations, cardiovascular problems and increased susceptibility to infections in people who lived or worked near RF/microwave antenna transmission sites.

<http://rfemf.com/>

◆ **Colorado Department of Health Audits of Lookout Mountain Broadcast Towers near Golden, Colorado:** State audits conducted in 1999 and 2004 found a statistically significant brain tumor incidence in populations living closest to and in direct line-of-sight to TV/FM radio towers on Lookout Mountain. Some affected populations were irradiated with broadcast radiation at levels 100 times or more lower than the FCC's non-ionizing radiation limits.

[https://www.colorado.gov/pacific/sites/default/files/Full\\_Tech\\_report\\_update.pdf](https://www.colorado.gov/pacific/sites/default/files/Full_Tech_report_update.pdf)

◆ **Santini et al. (2002)** 530 people living near mobile phone masts in France reported headaches, sleep disturbance, discomfort, irritability, depression, memory loss and concentration problems. These effects were more pronounced the closer people lived to the mast. The researchers concluded that the minimal distance of people from cell tower antennas should not be less than 300 meters. However, this recommended minimal distance pertains only to the antennas affecting people in this particular study and does not necessarily pertain to other antenna installations, which may be more far-reaching due to power density, or more acutely bio-intensive due to various frequencies emitted. **Santini R et al, (July 2002)**

Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex, *Pathol Biol (Paris)* 2002 Jul;50(6):369-73

<https://sites.google.com/site/nationalenvironmentsociety/cell-phone-tower-health-effects>

◆ **Santini et al. (2003)** This was the second part of the above Santini study, and it confirmed results of the 2002 study. It additionally showed that people irradiated for five years or more suffered significantly increased irritability, compared to those exposed to a shorter duration. Also, older people were documented to be more sensitive to the radiation. Homes that faced antennas, particularly within 100 meters, were documented to be the worst locations for certain debilitating symptoms. **Santini R et al.**, (September 2003) *Symptoms experienced by people in vicinity of base stations: II/ Incidences of age, duration of exposure, location of subjects in relation to the antennas and other electromagnetic factors*, *Pathol Biol (Paris)*. 2003 Sep;51(7): pp. 412-5.

<http://www.powerwatch.org.uk/rf/masts.asp>

◆ **Navarro EA et al. (2003)** This study, conducted in Spain, found that the greater the power density of microwaves in the home, the more severe were complaints of depression, fatigue, sleeping disorders, concentration problems, headaches, irritability, memory problems, loss of appetite, nausea, audio and visual dysfunction, dizziness and cardiovascular problems. The researchers concluded: "There is a large and coherent body of evidence of biological mechanisms that support the conclusion of a plausible, logical and causal relationship between RF exposure and neurological disease. Hence, it is probable that cell sites are causing many adverse health effects. Public health surveys of people living in the vicinity of cell site should be being carried out now, and continued progressively over the next two decades. This is because prompt effects such as miscarriage, cardiac disruption, sleep disturbance and chronic fatigue could well be early indicators of the adverse health effects." **Navarro EA et al.**, (December 2003) *The Microwave Syndrome: A Preliminary Study in Spain*, *Electromagn Biol Med* 22(2-3): pp. 161-169.

◆ **Eger et al. (2004)** This study, commissioned by the German Federal Agency for Radiation Protection, compiled medical histories between 1994-2004 of people living in Naila, Germany. The study found a threefold increase in malignant tumors for people exposed for five years or more to cell tower antennas within 400 meters, compared to people living further away from the antennas. **Eger H et al.**, (November 2004) *The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer*, *Umwelt Medizin Gesellschaft* 17,4 2004.

[http://www.emf-health.com/PDFreports/Germanreport\\_celltower.pdf](http://www.emf-health.com/PDFreports/Germanreport_celltower.pdf)

◆ **Wolf and Wolf (2004)** A Tel Aviv University study of 622 people living in Netanya, Israel, revealed an overall four-fold increase in the incidence of cancer among residents living within 350 meters of a mobile phone mast for a time period of between three and seven years. Among women in the 350-meter group, the increase in cancer was 10 times the norm, compared to people living in other areas of the city: "The study indicates an association between increased incidence of cancer and living in proximity to a cell phone transmitter station. Ronni Wolf, MD, Danny Wolf, MD, "Increased Incidence of Cancer near a Cell-Phone Transmitter Station," *International Journal of Cancer Prevention*, (April 2004), Vol. 1, Num. 2.

[http://www.powerwatch.org.uk/news/20050207\\_israel.pdf](http://www.powerwatch.org.uk/news/20050207_israel.pdf)

◆ **Bortkiewicz et al. (2004)** This Polish study confirmed that residents living close to mobile phone masts reported "various complaints mostly of the circulatory system, but also of sleep disturbances, irritability, depression, blurred vision, concentration difficulties, nausea, lack of appetite, headache and vertigo. The performed studies showed the relationship between the incidence of individual symptoms, the level of exposure, and the distance between a residential area and a base station. This association was

observed in both groups of persons, those who linked their complaints with the presence of the base station and those who did not notice such a relation."

<http://apps.who.int/peh-emf/research/database/emfstudies/viewstudy.cfm?ID=560>

◆ **California study (2004)** A pilot medical study, conducted by Dr. Gunnar Heuser of Agoura Hills, California, focused on neurological symptoms of six firefighters who had been working for up to five years in stations with cell towers on premises. Their symptoms included: slowed reaction time, lack of focus, lack of impulse control, severe headaches, anesthesia-like sleep, depression, tremors and toxic encephalopathy, involving brain damage to frontal and temporal lobes, as confirmed by SPECT brain scans. In 2004, citing this study, the US and Canadian membership of the International Association of Fire Fighters (IAFF) passed a resolution opposing the siting of cell tower antennas on or adjacent to fire stations.

[http://www.emrpolicy.org/news/press/pr\\_iaff\\_vote.pdf](http://www.emrpolicy.org/news/press/pr_iaff_vote.pdf)

◆ **Waldman-Salsam et al. (2004)** Medical doctors in Oberfranken, Germany, evaluated the medical complaints of 356 people exposed to cell tower radiation and in-home wireless devices. This irradiated population reported these symptoms: sleep disturbances, tiredness, forgetfulness, nose bleeds, vision and hearing problems, frequent infections, blood pressure abnormalities, hormonal and heart disturbances, nausea and night-time sweats. This information was presented to the German prime minister in a now-famous document known as the Bamberg Appeal, signed by 114 German physicians.

[www.vws.org/documents/Cell-Project-Documents/BambergAppeal.pdf](http://www.vws.org/documents/Cell-Project-Documents/BambergAppeal.pdf)

◆ **Hutter et al. (2005)** 365 people living near 10 different mobile phone masts in both urban and rural areas of Austria were studied. Reported symptoms of antenna radiation included: headache, vertigo, tremors, cold hands and feet, loss of energy, exhaustion, difficulty concentrating, feelings of strain and the urge for sleep. *These people were irradiated at levels of 0.2 to 0.4 volts per meter, which is hundreds of times lower than legal US exposure standards of 47 to 61 volts per meter.* The higher the voltage exposure, the higher the percentage of health complaints. The researchers concluded: "The results of this study indicate that effects of very low but long lasting exposures to emissions from mobile telephone base stations on well-being and health cannot be ruled out." "Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations." *Occupational and Environmental Medicine*, (May 2006). 63(5): pp.307-13.

<https://www.ncbi.nlm.nih.gov/pubmed/16621850>

◆ **Citizens Initiative Kempton West (2006-2007)** Anticipating the installation of a T-Mobile transmitter station in a neighborhood, 25 participating residents living between 15 to 300 meters from the new cell tower volunteered for blood sampling before the antennas were turned on. These volunteers removed all DECT phones and Wi-Fi systems from their homes for the test period. This study was part of a German-wide medical investigation into the effects of cell tower radiation on human health, led by Dr. Hans Scheiner in Munich. The study focused mainly on blood levels of the mood hormone serotonin and the sleep hormone melatonin, both created by the pineal gland. A healthy person creates serotonin by day for alertness and energy, melatonin by night for deep restorative sleep and protection from DNA damage. After the antennas were turned on, follow-up blood tests revealed this:

1. Fifty-six percent of volunteers suffered a fairly steep reduction of night time melatonin and 28 percent showed a more gradual decline, leading to considerable sleep disturbances, daytime exhaustion and immune deficiencies due to sleep deprivation.
2. Eighty-four percent of volunteers suffered a steep decrease in day time serotonin levels, resulting in depressive mood disturbances, lethargy, appetite abnormalities, agitation and general reduction of quality of life.

Signed by three medical doctors this study concluded: "Since the medically conducted tests carried out on residents living in the vicinity of the....mast prove a dramatically increased health risk, immediate action by political and regulatory authorities...are demanded."

[http://radiationresearch.org/pdfs/kempton\\_west.pdf](http://radiationresearch.org/pdfs/kempton_west.pdf)

◆ **Abdel-Rassoul, et al. (2006)** Residents living beneath or adjacent to a long-established mobile phone mast with numerous antennas in Egypt reported significantly higher occurrences of headaches, memory changes, dizziness, tremors, depressive symptoms and sleep disturbance than did a control group. "The 9th International Symposium on Neurobehavioral Methods and Effects in Occupational and Environmental Health," *NeuroToxicology*, (March 2007). Vol 28, (2), pp. 434–440  
<http://dx.doi.org/10.1016/j.neuro.2006.07.012>

◆ **Oberfeld et al. (2008)** The Austrian Department of Health uncovered a higher risk of cancer among people living 80-200 meters from a mobile phone antenna tower which operated for a car phone service between 1984 and 1997. The study concluded that the cancer risk increased with the length of exposure, reaching 8.5 times the norm for people most highly exposed. The study reported: "The incidence [of cancer] was particularly pronounced for breast and brain tumors." "The Microwave Syndrome: Further Aspects of a Spanish Study." <http://www.chronicexposure.org/basestations.html>

◆ **Eger et al. (2009)** The Bavarian town of Selbitz conducted a health survey of 251 residents exposed to cell tower radiation at no more than 1 volt per meter. The study found a significant correlation, depending on dose exposure, for: insomnia, depression, cerebral symptoms, joint illnesses, infections, skin changes, heart and circulation disorders, disorders of vision/ hearing and problems of the gastrointestinal tract. "Specific Health Symptoms and Cell Phone Radiation in Selbitz (Bavaria, Germany)-Evidence of a Dose-Response Relationship," *Umwelt Medizin Gesellschaft*, Feb. 2010: pp. 130-139. [http://www.umg-verlag.de/umwelt-medizin-gesellschaft/210\\_ej\\_z.pdf](http://www.umg-verlag.de/umwelt-medizin-gesellschaft/210_ej_z.pdf)

◆ **Balmori et al. (2009)** Researchers exposed tadpoles of the common frog to cell tower radiation from several antenna installations 140 meters from the study site. Control tadpoles were protected from the radiation by a shielded Faraday cage. The irradiated tadpoles were exposed for two months and suffered low coordination of movements, asynchronous growth (abnormally large and small tadpoles) plus a 90% mortality rate. The non-irradiated controls developed normally and suffered only a 4.2% mortality rate. The report concluded: "This research may have huge implications for the natural world, which is now exposed to high microwave radiation levels from a multitude of phones masts." "Mobile phone mast effects on common frog (*Rana temporaria*) tadpoles: the city turned into a laboratory." *Electromagnetic Biology and Medicine*. (June 2010), 29(1-2):31-5. doi: 10.3109/15368371003685363.  
<https://www.ncbi.nlm.nih.gov/pubmed/20560769>

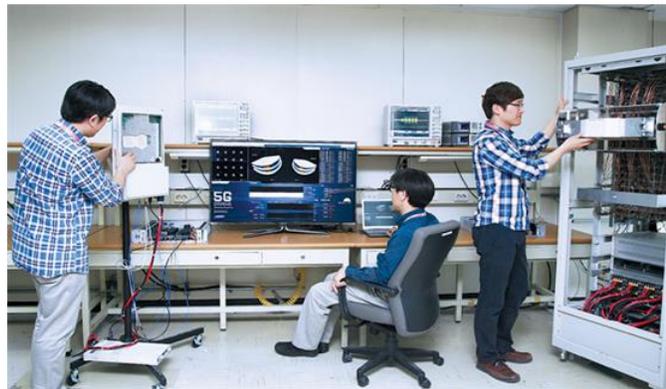
◆ **Dode et al. (2011)** University and municipality officials cooperated to document a striking connection between cell tower antennas and cancer deaths in Brazil's third largest city, Belo Horizonte. The study looked at 7,191 deaths by cancer in the city between 1996 and 2006. The highest rate of deaths from cancer was found among those who had lived within 500 meters of cell phone antenna towers. The highest rates of cancer were also found in the central-southern area of the city, which had the most cell towers. There were high rates of prostate, breast, lung, kidney and liver cancer among the victims living closest to tower antennas. "Mortality by neoplasia and cellular telephone base stations in the Belo

Horizonte municipality, Minas Gerais state, Brazil.” *Science of the Total Environment*, (Jul y 7, 2011).  
<http://www.ncbi.nlm.nih.gov/pubmed/21741680>

◆ **Buchner et al. (2011)** In this study conducted in Bavaria, Germany, urine samples of 60 study participants were analyzed for their adrenaline, noradrenaline, dopamine, and phenylethylamine (PEA) levels before and after the activation of a new GSM cell tower. After the activation of the antennas, the stress hormone levels increased significantly during the first six months while dopamine and PEA levels decreased substantially. Even after one and a half years, the initial normal hormone levels were not restored. Sleep problems, headaches, allergies, dizziness, and concentration problems were common. The highest exposure group was only  $100 \mu\text{W}/\text{m}^2$ , and only  $60 \mu\text{W}/\text{m}^2$  for the lowest exposure group. (These power density readings equate to .1 volts per meter squared to .2 volts per meter squared.) This study indicates that radio frequency transmitters induce radical changes in human stress hormones and set up the classic stress syndrome of adaptation followed by biological exhaustion, as established by Hans Seyle in the 1950s. The researchers stated that the effects of cell tower radiation "showed a dose-response relationship and occurred well below current limits for technical RF radiation exposures. Chronic dysregulation of the catecholamine system has great relevance for health and is well known to damage human health in the long run." "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields—A Long-term Study under Real-life Conditions."  
[www.avaate.org/IMG/pdf/Rimbach-Study-20112.pdf](http://www.avaate.org/IMG/pdf/Rimbach-Study-20112.pdf)

◆ **Yakymenko et al. (2011)** A team of Ukrainian scientists titled their overview of cell tower radiation "Long-term Exposure to Microwave Radiation Provokes Cancer Growth: Evidences from Radars and Mobile Communication Systems." These researchers concluded: "It is now becoming increasingly evident that assessment of biological effects of non-ionizing radiation based on physical (thermal) approach used in recommendations of current regulatory bodies...requires urgent re-evaluation....We also emphasize that the everyday exposure of both occupational and general public to MW radiation should be regulated based on precautionary principles which imply maximum restriction of excessive exposure." "Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems." *Experimental Oncology*, (June 2011); 33(2):62-70.  
<https://www.ncbi.nlm.nih.gov/pubmed/21716201>

◆ **Christopher Anthony and Daniel Chen (2011)** As part of a science curriculum project, these two fourteen-year-olds conducted a survey study at their school in Johannesburg, South Africa, regarding the health effects of a cell tower on their school campus. They additionally enrolled students at two other schools, also with cell towers on those campuses. Students who participated in the questionnaire study reported 21 different symptoms including: skin rash, muscular pains, heart palpitations, extreme fatigue, stomach problems, swollen lymph nodes, tinnitus, allergic reactions and metallic taste in the mouth. Seventy-nine percent of the students who participated reported some of these symptoms, thirty percent reported more than four symptoms, five percent suffered more than 10 symptoms and one percent suffered from up to 14 symptoms on the list. School officials at the boys' school reportedly initiated



proceedings to have the cell tower removed from their particular campus. Monica Laganparsad, “Kids vulnerable to cellphone tower radiation.” *Times Live*, (June 19, 2011) 03:42:56.

<http://www.timeslive.co.za/news/2011/06/19/Kids-vulnerable-to-cellphone-tower-radiation1>  
[www.ed-tech.co.za/tips/johannesburg-students-find-kids-vulnerable-to-cellphone-tower-radiation/](http://www.ed-tech.co.za/tips/johannesburg-students-find-kids-vulnerable-to-cellphone-tower-radiation/)

◆ **Eskander, et al. (2012)** This study followed volunteers who were exposed to microwave radiation from either mobile phones or cell tower antennas over a time period of six years. Blood tests were used for assessment. The study showed a significant decrease in volunteers' ACTH, cortisol, thyroid hormones, prolactin for young females, and testosterone levels. Researchers concluded that "high RFR (radio frequency radiation) significantly affects the pituitary-adrenal axis." “How does long term exposure to base stations and mobile phones affect human hormone profiles?” *Clinical Biochemistry*, (January 2012), Volume 45, Issues 1–2, pp. 157–161. [avaate.org/IMG/pdf/Eskander\\_et\\_al\\_2011.pdf](http://avaate.org/IMG/pdf/Eskander_et_al_2011.pdf)

◆ **Hassig et al. (2012)** Scientists documented eye abnormalities in calves exposed to cell tower radiation:

"We examined and monitored a dairy farm in which a large number of calves were born with nuclear cataracts after a mobile phone base station had been erected in the vicinity of the barn. Calves showed a 3.5 times higher risk for heavy cataract if born there compared to Swiss average. All usual causes such as infection or poisoning common in Switzerland could be excluded." “Prevalence of nuclear cataract in Swiss veal calves and its possible



association with mobile telephone antenna base stations,” *Schweiz Arch Tierheilkd*, (October 2009), 151(10):471-8. doi: 10.1024/0036-7281.151.10.471 <http://www.ncbi.nlm.nih.gov/pubmed/19780007>

◆ **Cy et al. (2012)** This Taiwanese study focused on childhood neoplasms (tumors) in relation to RF exposure from cell towers erected between 1998 and 2007. Researchers calculated the annual power emitted by all 71,185 cell towers in Taiwan and compared the calculated exposure of populations in each irradiated township: "This study noted a significantly increased risk of all neoplasms [tumors] in children with higher-than-median RF exposure to MPBS [mobile phone base stations]." “A population-based case–control study of radiofrequency exposure in relation to childhood neoplasm,” *Science of The Total Environment*, (October 2012), Volumes 435–436, pp. 472–478.

<http://www.sciencedirect.com/science/article/pii/S0048969712009114>

◆ **Gomez-Peretta et al. (2013)** This study in Spain was a re-analysis of the data collected for the Navarro study (2003). The researchers reported that pathological symptoms reported by irradiated people were validated once again. Exposure levels suffered by study participants were reported at only .2 volts to .6 volts per meter [compared to US maximum public exposure limit of 61 volts per meter]. “Subjective symptoms related to GSM radiation from mobile phone base stations: a cross-sectional study,” *BMJ Journals*, <http://bmjopen.bmj.com/content/3/12/e003836>; <http://dx.doi.org/10.1136/bmjopen-2013-003836>

◆ **Shahbazi et al. (2014)** This Iranian study was conducted on 250 randomly-selected people living near cell towers. Statistically significant symptoms included: nausea, headache, dizziness, irritability, discomfort, nervousness, depression, sleep disturbances, memory loss and lack of libido among people living within 300 meters of the cell tower antennas, compared to those living further away. "Health effects of living near mobile phone base transceiver station (BTS) antennae: a report from Isfahan, Iran." *Electromagn Biol Med.* (September 2014), 33(3):206-10. doi: 10.3109/15368378.2013.801352. <https://www.ncbi.nlm.nih.gov/pubmed/23781985>

◆ **Pall, M. L. (2015)** Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts a non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action. *Rev. Environ. Health*, (2015) Vol. 30, pp. 99–116. <http://www.sciencedirect.com/science/article/pii/S0891061815000599>

◆ **Sultan Ayoub Meo et al. (2015)** This study recruited students in Saudi Arabia for blood testing (ages 12 to 17) attending two comparable schools. Students in the school infused with the highest cell tower radiation suffered a higher rate of diabetes than the students less irradiated: "It is concluded that exposure to high RF-EMRF generated by mobile phone base stations is associated with elevated levels of HbA1c and risk of type 2 diabetes mellitus." "Response to Comments on Meo *et al.* Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus." *Int. J. Environ. Res. Public Health*, (2015), 12, 14519–14528. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4808925/>

◆ **Waldmann-Selsam (2016)** Using mathematical calculations of microwave power flux density, this field-monitoring study examined the effects of cell tower radiation on trees in two German cities: "Statistical analysis demonstrate that electromagnetic radiation from mobile phone masts is harmful for trees. These results are consistent with the fact that damage afflicted on trees by mobile phone towers usually starts on one side, extending to the whole tree over time." "Tree damages in the vicinity of mobile phone base stations," [https://www.google.ca/search?q=Waldmann-Selsam+\(2016\)+&ie=utf-8&oe=utf-8&gws\\_rd=cr&ei=uRimWPGUCeig0wLjzI2IAg](https://www.google.ca/search?q=Waldmann-Selsam+(2016)+&ie=utf-8&oe=utf-8&gws_rd=cr&ei=uRimWPGUCeig0wLjzI2IAg)

◆ **Golati et al. (2016)** The objective of this study was to evaluate human genetic damage caused by radiation from mobile tower antennas and to ascertain whether that damage might be dependent upon the aberrant GSTM1 and GSTT1 genes. Scientists studied 116 persons exposed to radiation from mobile towers and 106 control subjects. All were genotyped for polymorphisms in the GSTM1 and GSTT1 genes by the multiplex polymerase chain reaction method. The researchers looked for DNA damage in peripheral blood lymphocytes using alkaline comet assay and micronucleus assay in buccal (mouth tissues) cells. They found no evidence that the two particular genes were involved in promoting that DNA damage among the subjects. But they did find significant DNA damage among cell tower subjects as compared to the non-irradiated control group: The report states: "...There was a



significant increase in BMN [micronucleus assay in buccal cells] frequency and TM [tail moment] value in exposed subjects ( $3.65 \pm 2.44$  and  $6.63 \pm 2.32$ ) compared with control subjects ( $1.23 \pm 0.97$  and  $0.26 \pm 0.27$ )..." "Effect of GSTM1 and GSTT1 Polymorphisms on Genetic Damage in Humans Populations Exposed to Radiation From Mobile Towers," *Archives of Environmental Contamination and Toxicology*, (April 2016), Volume 70, Issue 3, pp 615–625. <http://link.springer.com/article/10.1007/s00244-015-0195-y>

◆ **Siersma et al. (2016)** As a pilot run for future and larger studies, medical scientists from Denmark and Sweden launched an electronic questionnaire posted to special interest websites. The questionnaire requested feedback on symptoms suffered by people exposed to cell phones, Wi-Fi, occupational radiation, energy-saving light bulbs and cell towers. Of sixty respondents, significant associations were noted for both chronic exposure to Wi-Fi and for cell tower exposure. Symptoms associated with tower antennas included: cognitive, head, eye, body and skin problems. The report noted: "Mobile phone towers seem to be the most problematic of the various EMF exposures." "Vicinity to Wireless Radiation Sources and the Prevalence of Various Health Problems: A Pilot Survey," (This information was collected by four medical specialists representing the Department of Public Health in Copenhagen and the Department of Neurosciences of the Karolinksa Institute in Stockholm, Sweden, for presentation to the 2016 Europe Conference of the World Organization of National Colleges, Academies and Academic Association of General Practitioners (WONCA) held in June, 2016.) [http://wi-cancer.info/notes\\_antenna\\_sickness.aspx](http://wi-cancer.info/notes_antenna_sickness.aspx)

### RF/Microwave Regulations in France

In 2015, national legislation provides these protections in regards to RF/microwave antenna pollution:

- Cell tower compliance with public exposure standards are routinely verified by officials of the National Radiofrequency Agency,
- Up-to-date environmental/cell tower maps plus radiation measurements near homes are made available to the public and every resident is able to access information on radiation levels in his own living spaces,
- Areas with atypical microwave exposure are subject to consistent compliance inspection and enforcement,
- The French national government continues evaluation of health effects from microwave antennas and follows up with scientific research to study public health effects,
- All Wi-Fi hotspots are clearly marked with a warning pictogram.

France and many other countries are moving towards this sanity because the number of media reports about human cancer clusters near cell towers is staggering. A 2010 report in the Telegraph newspaper of Britain is typical: "Half of the residents of Buckler, Cornwall, have complained of ill health since the structure [mobile phone antenna tower] was installed two years ago. They believe that the 02 mobile phone mast has contributed to the death of eight residents from cancer since it was built. 'We are living in a cancer cluster,' said Mr. Lewis. 'More than fifty per cent of the residents here said they have had serious health problems since the mast was put up. Then people suddenly started dying from cancer and now two more have just been diagnosed and one of those is terminally ill.'"

Such reports from around the world have been accumulating for decades, one of them documenting a cancer cluster of over one hundred cases at a public school in Spain with an antenna tower on campus.

There are countless archived reports of entire communities reporting ill health after cellular antennas are activated, such as 162 antenna-sickened people in Nobeoka City, Japan. Yet tragically, America's federal, state and local governments profit so hugely from the Wi-cancerization of the USA, that none see fit to enforce proper environmental radiation measurements and compliance. Crucial cell tower emissions information is kept inaccessible to the public. There is no popular demand for proper tower setbacks from inhabited buildings. There is no momentum for desperately needed investigations of neighborhood antenna sickness. The obvious reward for such savage oblivion is the fact that the women of North America -- USA and Canada -- now suffer the highest female cancer rates in the world.

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Canadian Medical Association Journal (CMAJ)

Paul Christopher Webster, Toronto, Ont.

May 7, 2015

Federal parliamentarians concluded three hearings into Health Canada's safety regulations for cell phones and *other wireless devices* by asking for a detailed analysis of numerous recent cancer studies that indicate far tougher safety regulations may be warranted.

The studies in question were not acknowledged in the scientific review, *Safety Code 6 (2015)* — *Rationale*, which exclusively released to *CMAJ* by Health Canada. The Safety Code 6 guideline, which was released Mar. 13, states that no new biological information pertinent to safety guidelines has emerged since 2009. Further, it states that the large number of recent studies raising safety concerns "suffer from a lack of evidence of causality, biological plausibility and reproducibility and do not provide a credible foundation for making science-based recommendations." ***This contention led scientists and safety advocates at the hearings before Parliament's Standing Committee on Health to mount a withering attack, saying that Health Canada's Rationale and Safety Code 6 are outdated, incomplete and invalid.***

As a result, at the conclusion of the hearings on Apr. 30, the Standing Committee on Health asked Health Canada to "provide detailed information in the form of a full scientific monograph" on its assessment of 140 studies identified as alarming by Canadians for Safe Technology, an Oakville, Ontario-based advocacy group. The group's CEO, Frank Clegg told the health committee on Apr. 23 that despite paying the Royal Society of Canada \$100 000 to convene a panel to assess the safety of radiowave-emitting devices (a panel that was subsequently marred by conflict-of-interest allegations and the resignation of its chairman) "Health Canada has not invested the necessary time, nor had the balanced opinion of experts necessary to undertake a proper review."

After noting that health regulators failed to forestall public health disasters with tobacco, asbestos, bisphenol A, thalidomide, DDT and urea formaldehyde insulation, Clegg said "prudent avoidance" should be recommended with cell phones and Wi-Fi "until the science proves beyond reasonable doubt that there is no potential for harm. For the last three years science has published a new study every month that shows **irreparable harm at levels below Safety Code 6.**"

Clegg told the health committee that China and Russia have guidelines 100 times safer than Health Canada's *Safety Code 6*. "Canada should be among progressive countries such as France, Belgium and Taiwan that have laws in place to protect children in the home and at school or daycare centres," Clegg says. "A proper scientific evaluation would clearly show that Health Canada is not taking the appropriate action to safeguard the health of Canadians."

Clegg's comments echo those of Terence Young, the Conservative MP for Oakville, Ont. Who has a record of successfully proposing and passing health safety legislation. In January, Young Canadian Medical Association Journal tabled a private member's bill that would require manufacturers to place

clearly visible safety warnings on all cell phones, cordless phones and *radio frequency–emitting devices such as Wi-Fi transmitters*.

In an intense confrontation at the health committee meeting, Young demanded that Health Canada explain its methodologies for rejecting evidence from a series of recently published studies by Swedish researcher Dr. Lennart Hardell. In his most recent study, Hardell concluded "that glioma and also acoustic neuroma are caused by RF-EMF emissions from wireless phones, and thus regarded as carcinogenic ... indicating that current guidelines for exposure should be urgently revised" (*Pathophysiology* 2015;22:1-13).

James McNamee, chief, Health Effects and Assessments Division, at Health Canada's Healthy Environments and Consumer Safety Branch, who is the Rationale's principal author, responded to Young's inquiry. He said the department's evaluation principally relied on a scientific review completed in May 2011 by the World Health Organization's International Agency for Research on Cancer (IARC), which concluded that cellphones and other wireless devices such as cordless phones and Wi-Fi transmitters are possibly — although not probably — carcinogenic.

"We're subject to the evidence base we have at this time," said McNamee, who coauthored two scientific reviews with scientists who have acknowledged accepting payments from industry and government in return for promoting industry and government safety assurances (*J Toxicol Environ Health B* 2009;12:2004-7; *Int J Radiat Biol* 2005 81:189-203).

McNamee's reliance on the studies included in the IARC's four-year-old review as still the most pertinent evidence available was subsequently called into question during the health committee hearings by one of the IARC review's own authors. Dr. Anthony Miller, a University of Toronto professor emeritus who served as scientific secretary for the IARC panel, says Hardell's new research "reinforces the evidence that radio frequency fields are not just a possible human carcinogen, but a probable human carcinogen."

Hardell's studies, Miller told the committee members, "would be impossible to ignore in regulatory approaches to such a hazard" had Health Canada carefully considered them. Hardell agrees. After reviewing the Rationale, Hardell described Health Canada's safety guidelines in an interview with *CMAJ* as "a disaster to public health" and based on a scientific analysis "unwilling or not competent to make evaluation of the current literature."

Miller says the Rationale overlooks numerous other important studies as well as Hardell's, including a recent study by Gaëlle Coureau, of Université Bordeaux Segalen, which concluded that it supports "previous findings concerning a possible association between heavy mobile phone use and brain tumours" (*Occup Environ Med* 2014;71:514–22).

After reviewing the Rationale, Coureau told *CMAJ* its analysis of the epidemiological literature did not warrant discussion.

Hardell and Coureau are not the only authors of recent studies raising concerns about cellphone safety who take issue with McNamee's Rationale and *Safety Code 6*. At McGill University in Montréal, Paul Héroux, author of a recent paper indicating extra-low-frequency magnetic fields alter cancer cells through metabolic restriction, describes the Rationale as a document that deliberately ignores all studies that call *Safety Code 6* into question. (*Electromagn Biol Med* 2014;33:264-75). "The soul of science is to revise health protection when evidence undermines previous thinking and this review fails to do that."

At Washington University in Seattle, Henry Lai, author of numerous studies indicating radiofrequency exposure appears to affect DNA damage and repair, described the Rationale to *CMAJ* as "simplistic and out-of-date" with "too much focus on dosimetry and theoretical calculations, at the expense of basic

concepts of biology and health." The Rationale, Lai adds "fails to take into account at least a couple of hundred papers published between 2009 and 2014 on the biological effects of radiofrequency radiation, such as changes in cellular and reproductive functions. Many of these studies show effects at exposure levels much lower than the [*Safety Code 6*] limits."

Although *CMAJ* was invited by Health Canada to interview McNamee before he testified to the committee, the invitation was withdrawn without explanation after he testified. In response to written questions submitted to McNamee by *CMAJ*, Health Canada emailed a statement on Apr. 30 explaining that "Departmental scientists considered all available peer-reviewed scientific studies when developing the exposure limits in the revised *Safety Code 6*."

Their review "employed a weight-of-evidence approach when evaluating possible health risks," the Department explained, while acknowledging it has elected not to publish McNamee's Rationale on its website devoted to *Safety Code 6*. "Health Canada's updated *Safety Code 6* makes Canada's limits among the most stringent science-based limits in the world," it added. DOI:10.1503/cmaj.109-5061

## Medical Doctors Consensus Statements and Recommendations on Cell Phones/Wireless

Environmental Health Trust:

*"It is a fact that not a single medical organization states that cell phone/wireless radiation is safe. There is no proof of safety. Thousands of medical doctors support reducing exposure to cell phone wireless radiation."*

<http://ehtrust.org/science/medical-doctors-consensus-statements-recommendations-cell-phoneswireless/>

## **Endnotes:**

<sup>1</sup> <https://www.fcm.ca/home/events/past-conferences/2013-annual-conference-and-trade-show/the-fcmcwta-antenna-system-siting-protocol-template-recognizing-the-importance-of-local-knowledge-in-deploying-telecommunications-infrastructure.htm>

<sup>2</sup> LENNART HARDELL and MICHAEL CARLBERG Department Of Oncology, Faculty of Medicine and Health, Örebro University, SE-701 82 Örebro, Sweden; TARMO KOPPEL Department of Labour Environment and Safety Tallinn University of Technology, SCO351 Ehitajate tee 5, 19086 Tallinn; MIKKO AHONEN Institute of Environmental Health and Safety, 11615 Tallinn, Estonia; LENA HEDENDAHL Independent Environment and Health Research Luleå, SE-972 53 Luleå, Sweden, "Radiofrequency radiation at Stockholm Central Railway Station in Sweden and some medical aspects on public exposure to RF fields," *International Journal of Oncology*, (Received June 5, 2016; Accepted July 27, 2016). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5021254/>

<sup>3</sup> [https://apps.fcc.gov/edocs\\_public/attachmatch/DA-16-1427A1.txt](https://apps.fcc.gov/edocs_public/attachmatch/DA-16-1427A1.txt)

<sup>4</sup>[https://www.google.ca/search?q=FCC+Public+Notice+comment+sought+on+streamlining+public+deployment&dq=FCC+Public+Notice+comment+sought+on+streamlining+public+deployment&gs\\_l=serp.3...77460.90755.0.92047.68.52.0.0.0.0.336.7884.0j21j15j2.38.0...0...1c.1.64.serp...34.26.5155...0j30i10k1j0i22i30k1j0i22i10i30k1j33i160k1j33i21k1.FOStogKP9l0](https://www.google.ca/search?q=FCC+Public+Notice+comment+sought+on+streamlining+public+deployment&dq=FCC+Public+Notice+comment+sought+on+streamlining+public+deployment&gs_l=serp.3...77460.90755.0.92047.68.52.0.0.0.0.336.7884.0j21j15j2.38.0...0...1c.1.64.serp...34.26.5155...0j30i10k1j0i22i30k1j0i22i10i30k1j33i160k1j33i21k1.FOStogKP9l0)